

**BELLCOMM, INC.**

1100 Seventeenth Street, N.W. Washington, D. C. 20036

**SUBJECT:** Operational Intercommunication  
System Monitoring During  
Apollo 5 FRT - Case 900

**DATE:** January 3, 1968

**FROM:** B. F. O'Brien

ABSTRACT

The performance of the Operational Intercommunication System - Audio (OIS-A) was monitored during part of the Apollo 5 Flight Readiness Test at KSC and MCC-H on December 22, 1967.

This memorandum provides a summary of the observations made during the tests. In general, the quality of the voice circuits was very good. There were a few instances of noise bursts, crosstalk and test tones, and almost no complaints were heard from the users.

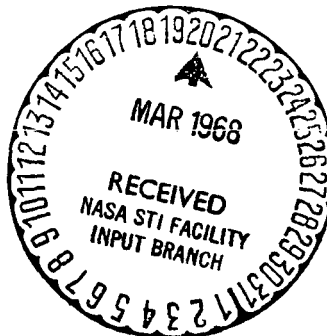
(NASA-CR-93383) OPERATIONAL  
INTERCOMMUNICATION SYSTEM MONITORING DURING  
APOLLO 5 FRT (Bellcomm, Inc.) 7 p

N79-72627

Unclas  
11091

00/32

FF No. 602	CP-72285	
	(NASA CR OR TMX OR AD NUMBER)	(CATEGORY)
[REDACTED]		



**BELLCOMM. INC.**

1100 Seventeenth Street, N.W. Washington, D. C. 20036

**SUBJECT:** Operational Intercommunication  
System Monitoring During  
Apollo 5 FRT  
Case 900

**DATE:** January 3, 1968

**FROM:** B. F. O'Brien

MEMORANDUM FOR FILEIntroduction

The performance of the Operational Intercommunication System - Audio (OIS-A) was monitored by Bellcomm personnel during part of the Apollo 5 Flight Readiness Test (FRT) on December 22, 1967. Messrs. J. T. Raleigh, J. J. Hibbert and the writer listened to OIS circuits at KSC; and Messrs. J. E. Johnson and H. Kraus monitored the OIS circuits that went to MCC-H. This memorandum briefly summarizes the observations made during the test.

Observations at KSC

At KSC, the monitoring was done at a standard OIS station located in Room 101 of the Blockhouse at Launch Complex 37. The station was monitored from 0930z to 2030z. The OIS circuits appearing at this station were: Black 1, 2, 5, 6 and 7; Red 1, 2, 4, 5 and 6; Blue 2, 4, and 5; Grey 1 and 2; Yellow 1, 2, and 4; Brown 1 and 2. See Attachment 1 for channel assignments. Because it was not possible to gain access to the Blockhouse earlier in the morning, some initial monitoring was begun at the Communication Distribution and Switching Center (CDSC). However, the spare position available in the Communications Control area in the CDSC had only a few circuits appearing on it and was not very suitable for monitoring purposes.

A frequent source of noise was open microphones, and on several occasions, the appropriate test conductor requested the users to check for locked-open talk keys. It is believed that in most cases, the talk keys were locked open unknowingly. Open talk keys were noted by the test conductors or by the test monitors at the following times on the circuits noted:

1034z Blue 4	1530z Red 6
1105z Black 5	1559z Black 1
1155z Red 6	1725z Black 6
1230z Black 2	1737z Black 1

1400z Grey 1	1740z Black 2
1430z Red 6	1900z Black 1
1458z Black 1	

There were also several cases of users talking on the wrong channel, either by selection of the wrong channel, or by talking on the active channel while listening on the monitor channel.

Black 1 (LV Test Conductor) and Red 3 (IU Test Conductor) were bussed together for approximately three hours; from 1209z to 1530z. For part of this time, the Red 3 users were required to go to another circuit to keep Black 1 clear.

The Supervisor of Range Operations (SRO) was having difficulty in hearing a complete conversation, although both sides of the conversation were intelligible at the monitoring position. At 1121z, SRO stated three times that the first part of transmissions to him were not being received. Again at 1458z, SRO requested CVTS to repeat his message.

At Launch Complex 37, the level of SRO and GMIL sounded high in comparison to other users. This condition was also noted during the Apollo 4 tests.

Several cases of buzzing and humming noises were observed on the system. The times and the circuits on which these occurred were:

- 1105z Hum on Black 1
- 1105z Buzz on Blue 5
- 1155z Buzz on Blue 5 (Not continuous)
- 1725z Buzz on Red 1
- 1935z Buzz on Yellow 1
- 1924z Buzz on Black 1

The voice of the Flight Director from MCC-H was heard to be breaking up at 1521z on an unidentified channel. At 1729z an intermittent squeal was reported to be on Green 9.

MCC-H Observations

At MCC-H, the OIS-A was monitored at Console Communication System (CCS) position 721 in the Simulation, Check-out, and Training System (SCATS) control area on the second floor. This position was configured for the Mission Director Staff Assistant. Other consoles in the SCATS area with different OIS channels were also available, and were monitored on a spot-check basis. Monitoring at MSC was conducted from 1010z to 2310z. The general quality of the OIS circuits was noted as follows:

Black 1 Moderately noisy - decreased during test

Black 2 Moderately noisy - low-level hum

Black 3 Low noise, some crosstalk

Black 4 Low noise low level hum, low

Green 3 No noise, apparently not connected

Green 4 Moderately low noise

Green 5 Very low noise

Green 10 Very low noise

Brown 1 Low noise

Yellow 3 No noise, apparently not connected

123 Moderate noise

Black 1, 2 and 4 were monitored almost continuously, as were the Flight Director, Cape Network Coordinator, 111 RSO, and GOSS Conference circuits. These latter circuits were generally quite satisfactory in performance.

At the monitoring position, it was possible to listen to several channels simultaneously. Because of this, there were many occasions when it was not possible to identify the channel of interest. In the following comments, those channels which were identified, are so noted. Noises were heard at the monitoring position at the following times:

1025z Several short rings which may have been caused by a Long Lines problem.

1346z Static-filled buzzing in approximately five-second bursts.

1408z Ringing sounds  
1443z Brief noise burst  
1500z Static and buzzing in approximately five-second bursts  
1634z, 1658z and 1807z - squealing

Requests to look for open microphones were heard at 1503z, 1606z and 1924z. A comment was heard on an unidentified loop at 1102z pertaining to someone "tweaking up" the OIS at a time when it interfered with a voice recorder check. At 1240z, a complaint of voice breaking up on Black 1 was heard, but the voice break-up was not detected at the monitoring position. At 1244z, two simultaneous conversations were heard on Black 1, apparently due to a cross connection between two channels.

From 2104z to 2108z, CVTS and the Flight Director called each other several times, but received no answer. Both users were heard clearly at the monitoring position. Contact was finally established on Black 1, and trouble was reported on Black 2. At 2135z, Black 2 was reported as tested OK. At 2143z, it was reported that the trouble on Black 2 was caused by the switcher dropping out.

#### Comments

In general, the quality of the voice circuits was very good, and the overall performance was considered significantly better than during Apollo 4. The traffic load on the system was light, and for most of the monitoring time, only one or two channels at a time were observed as being busy. There were very few instances of noise bursts, crosstalk and test tones, and almost no complaints were heard from the users. The absence of noise repeatedly breaking squelch was considered an improvement, particularly at MCC-H where this noise can be heard on several channels at one time.

Although the monitoring position at KSC had twenty circuits available for monitoring, only four of these were circuits which were extended to MCC-H. In addition, no LEM circuits were available. For the CDDT and Countdown, it would be desirable to enable the MO observers to monitor some Houston/LEM circuits and, if possible, Black 3.

2034-BFO-ew  
Attachment

*B. F. O'Brien*  
B. F. O'Brien

DATE: 15 DECEMBER 1967  
REVISION

APOLLO/SATURN  
LAUNCH OPERATIONS

TEST NO. I-41007-204  
VEHICLE SA-204/LM-1

SA-204 LM-1 COMPLEX 37 CHANNEL ASSIGNMENTS OIS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SUPERVISOR	BE-1 LV TEST CONDUCTOR	BE-2 TEST SUPERVISOR (166)	BE-3 SPACECRAFT TEST CONDUCTOR (166)	BE-4 SPACECRAFT TEST ENGINEER (167)	BE-5 S-IB TEST CONDUCTOR	BE-6 S-IVB TEST CONDUCTOR	BE-7 TEST SUPPORT CONTROLLER QTY & OIS (263)							
MECHANICAL	RD-1 S-IB VECH. MECH.	RD-2 S-IVB PROP. PROP.	RD-3 IU TEST CONDUCTOR	RD-4 S-IB & SUPPORT ENGINEER (167)	RD-5 ENVIRONMENTAL CONTROL SYSTEM	RD-6 LV PROP								
ELECTRICAL	BL-1 S-IB VECH. ELECTRICAL	BL-2 S-IVB ELEC. MECH.	BL-3 COMPLEX MANAGER	BL-4 IU VECH ELECTRICAL	BL-5 LV GROUND ELECTRICAL & TROUBLE SHOOTING									
DATA & CONTROL	YE-1 LV STABL & ALIGN	YE-2 LV FLIGHT CONTROL	YE-3 LV GUIDANCE FLIGHT COMPUTER	YE-4 ACA 110A COMPUTER										
MEASURING	BR-1 S-IB MEASURING	BR-2 S-IVB MEASURING	BR-3 IU MEASURING	BR-4 GROUND MEASURING										
RF & TV	GT-1 LV TV	GT-2 LV RF	GT-3 LV DMS											
LUNAR MODULE	GN-1 LM PAD LEADER (151)	GN-2 LM ELECTRICAL POWER & SEQUENCE (152)	GN-3 LM GUIDANCE & NAVIGATION (153)	GN-4 LM STABILIZATION CONTROL (154)	GN-5 LM COMMUNICATIONS (155)	GN-6 LM INSTRUMENTATION & TM (156)	GN-7 LM REACTION CONTROL SYSTEM (157)	GN-8 SLA NAA TEST PROJECT ENGINEER (158)	GN-9 LM ECS (161)	GN-10 LM PROPULSION (162)	GN-11 LM ACCEPTANCE CHECKOUT EQUIPMENT (163)	GN-12 LM GSE QUALITY CONTROL (164)	GN-13 LM RADAR (165)	

NOTE: NUMBERS IN PARENTHESES REFER TO MEO OIS DESIGNATIONS.

Attachment I

# BELLCOMM, INC.

Subject: Operational Intercommunication    From: B. F. O'Brien  
System Monitoring During  
Apollo 5 FRT

## Distribution List

### NASA Headquarters

Messrs. J. K. Holcomb/MAO  
T. J. Keegan/MA-2  
I. J. Mason/MOG  
W. E. Miller, Jr./MOB  
W. C. Schneider/MLM  
J. D. Stevenson/MO  
F. E. Stout/MAO  
W. M. Wallace/MAO

### KSC

Messrs. R. A. Browne/QH  
R. D. Harrington/MC  
A. J. Parrish/QJ-1(2)  
W. E. Parsons/MJ

### MSC

Messrs. C. W. Busch/BG6  
L. Dunsieith/FS  
J. A. Frere/FS4  
G. E. Metcalf/FS4

### Bellcomm

Messrs. C. Bidgood  
W. J. Benden  
A. P. Boysen, Jr.  
R. K. Chen  
C. H. Eley  
D. R. Hagner  
J. J. Hibbert  
W. C. Hittinger  
B. T. Howard  
J. E. Johnson  
E. J. Klein  
H. Kraus  
J. P. Maloy  
J. Z. Menard  
I. D. Nehama  
J. T. Raleigh  
I. I. Rosenblum  
I. M. Ross  
K. Schmid  
N. W. Schroeder  
L. Schuchman  
R. L. Selden  
B. P. Tunstall  
R. L. Wagner  
A. G. Weygand  
W. D. Wynn

Central Files  
Library  
Department 1023